

PATENT CLAIMS

1. A software component (1, 2, 3) for a distributed control system having application units (4, 5) which comprise one or more logic function nodes which each define an individual control system function in the application units and, in order to achieve a desired functionality for the control system interact with one another, or are capable of interacting with one another; said software component comprising:

a function means for implementation of a logic function node;

a negotiation means for receiving a connection instruction relating to a connection to be set up to at least one further function node and for agreeing upon possible usable connection parameters between the function node and the at least one further function node during a composition phase of the control system; and

a connection means for setting the connection parameters agreed upon between the function means and for data transmission between the connected function means during a runtime of the control system.

2. The software component as claimed in claim 1, characterized in that the negotiation means has a composition interface for communication with a control system composition tool for receiving the connection information; and

a system interface (1b, 2b, 3b) for communication with other software components during the negotiation.

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3. The software component as claimed in claim 1 or 2,  
characterized in that the connection means has a  
runtime interface (1c, 2c, 3c) for data  
transmission between the connected function nodes.
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4. The software component (1, 2, 3) as claimed in  
claim 3, characterized in that the runtime  
interface (1c, 2c, 3c) is connectable via a  
network structure to runtime interfaces (1c, 2c,  
10 3c) of other software components (1, 2, 3).
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5. The software component (1, 2, 3) as claimed in one  
of claims 1 to 4, characterized in that said  
software component furthermore has a presentation  
means for displaying the function node which is  
implemented by it, in a control system composition  
15 tool.
- 20 6. The software component (1, 2, 3) as claimed in one  
of claims 1 to 5, characterized in that said  
software component comprises a communication  
channel between the connection means and the  
negotiation means for transmitting the connection  
parameters which have been agreed upon by the  
negotiation means to the connection means.
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7. The software component (1, 2, 3) as claimed in one  
of claims 1 to 6, characterized in that said  
software component is a distributed system, in  
30 which function means and connection means are  
separated from the negotiation means and the  
presentation means.
- 35 8. The software component (1, 2, 3) as claimed in one  
of claims 1 to 7, characterized in that the  
function nodes are logical nodes in the sense of  
IEC Standard 61850.

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9. The software component (1, 2, 3) as claimed in one of claims 1 to 8, characterized in that the function means comprises a database for storing parameters relating to the function node and/or relating to possible connections.

10. A control system  
having a number of software components (1, 2, 3)  
as claimed in one of claims 1 to 9;

15 having a control system composition tool for connecting negotiation means of the software components (1, 2, 3); and

20 having a communication system for connecting the connection means of the software components (1, 2, 3) during a runtime.

25 11. The control system as claimed in claim 10,  
characterized in that the communication system is a network or a bus system which is connectable to all the software components (1, 2, 3).

30 12. The control system as claimed in claim 10 or 11,  
characterized in that said control system has a negotiation communications system via which the negotiation means and the control system composition tool can communicate with one another.

35 13. Use of software components (1, 2, 3) for representation of function nodes of application units in a control system with the function nodes each defining an individual control system function in the application units and, in order to achieve a desired functionality of the control system, interact with one another, or are capable of interacting with one another.

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14. A method for designing a control system having the following steps:

- 5       - In a control system composition tool, connecting the negotiation means of at least two software components (1, 2, 3) as claimed in one of claims 1 to 9, whose function means are intended to interact with one another;

- 10      - By means of the connected negotiation means, determining the compatibility of the at least two function means, which are intended to interact with one another;

- 15      - Agreeing upon usable connection parameters for data transmission between the function means by means of the connected negotiation means;

- 20      - Transferring the connection parameter information to the connection means; and

- 25      - Connecting the connection means on the basis of the connection parameter information.

15. The method as claimed in claim 14, characterized in that connecting the negotiation means is done by means of a graphical user interface, which is capable of displaying representations of the function nodes and displaying the connections established between said function nodes.

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35      16. A computer program product, which can be loaded into an internal memory of a digital data processing means and has computer program code means, which carry out the method as claimed in claim 14 or 15 when they are loaded and run on one or more data processing means.

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